

In the Claims

The claims are as follows.

1. (Currently Amended) A method of ~~preparing an~~ removing contaminants
from an article surface comprising the steps of:

providing at least two fluids of differing densities such that a fluid interface
exists between each fluid;

providing an article with one or more ~~reactive components~~ contaminants on a
surface of the article having a greater affinity or solubility to one of the at
least two fluids;

positioning the article into one of the at least two fluids; and

~~treating~~ removing one or more of the ~~reactive components~~ contaminants on the
article surface by passing the article through at least one fluid interface
vertically, horizontally, or at any other orientation.

2. (Currently Amended) The method of claim 1 wherein in the step of
providing an article with a ~~reactive component~~ contaminant on the surface of the
article having a greater affinity or solubility to one of the at least two fluids, the one
of the at least two fluids having a greater affinity or solubility to the ~~reactive~~
~~component~~ contaminant has a higher density than another of the at least two fluids.

Sub D2

1 3. (Currently Amended) The method of claim 2 wherein the step of providing
 2 at least two fluids of differing densities comprises providing water and chloroform
 3 such that the ~~reactive component~~ contaminant ~~comprising water or water soluble~~
 4 ~~contaminants~~ will remain in ^{11/2} the water layer when the article is passed through
 5 the fluid interface into a chloroform layer and further including the step of
 6 removing the water layer prior to removing the article.

C1

1 4. (Currently Amended) The method of claim 1 wherein in the step of
 2 providing an article with a ~~reactive component~~ contaminant on a surface of the
 3 article having a greater affinity or solubility to one of the at least two fluids, the one
 4 of the at least two fluids having a greater affinity or solubility to the ~~reactive~~
 5 ~~component~~ contaminant has a lower density than the other of the at least two
 6 fluids.

1 5. (Currently Amended) The method of claim 4 wherein the step of providing
 2 at least two fluids of differing densities comprises providing water and ether such
 3 that the ~~reactive component~~ contaminant ~~comprising water or water soluble~~
 4 ~~contaminants~~ will remain in ^{11/2} the water layer when the article is passed through
 5 the fluid interface.

1 6. (original) The method of claim 1 wherein the step of providing at least two
 2 fluids of differing densities includes providing a pressurized gas.

Sub 2

1 7. (Currently Amended) The method of claim 1 wherein the step of ~~treating~~
2 removing the reactive-component contaminant comprises etching the ~~reactive~~
3 ~~component~~ contaminant on the article surface by positioning the article in the fluid
4 having a greater affinity or solubility for the ~~reactive-component~~ contaminant, such
5 fluid being denser than another of the at least two fluids.

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1 8. (Currently Amended) The method of claim 1 further including the step of
2 terminating the ~~treating-removing~~ step by extracting the article through the fluid
3 interface into another of the at least two fluids having substantially no affinity to
4 the ~~reactive-component~~ contaminant.

1 9. (Currently Amended) The method of claim 1 further including the step of
2 terminating the ~~treating-removing~~ step by removing one of the at least two fluids
3 having substantially no affinity to the ~~reactive-component~~ contaminant.

1 10. (Currently Amended) The method of claim 1 wherein in the step of
2 providing an article with a ~~reactive-component~~ contaminant, the ~~reactive~~
3 ~~component~~ contaminant having a greater affinity or solubility to a fluid having a
4 higher density than another of the at least two fluids, and wherein the step of
5 positioning the article into the at least two fluids comprises positioning the article
6 into the at least two fluids with agitation or energy input which is periodic in time,

7 or any combination thereof and further including the step of ceasing the agitation
8 and passing the article through the fluid interface.

Sub 12
1 11. (Currently Amended) The method of claim 1 wherein the fluids are mixed
2 at an elevated temperature and further including the steps of ceasing the mixing at
3 an elevated temperature and cooling the fluids such that the fluid having a higher
4 density with an affinity for the ~~reactive component~~ contaminant settles and passing
5 the article through the fluid interface.

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1 12. (Currently Amended) A method of ~~preparing~~ removing a contaminant from
2 a workpiece surface comprising the steps of:
3 providing a reaction vessel having a first inlet/outlet means located at a bottom
4 of the vessel and a second inlet/outlet means located above the first outlet
5 means;
6 providing a first fluid into the reaction vessel;
7 providing at least one other fluid into the reaction vessel, the at least one other
8 fluid having a higher density than the first fluid such that a fluid interface
9 exists between the first fluid and the at least one other fluid;
10 providing a workpiece having a surface ~~component~~ contaminant having a
11 greater affinity or solubility to either the first fluid or the at least one other
12 fluid;

13 submerging the workpiece into the reaction vessel having the first fluid and the
14 at least one other fluid such that the workpiece is below the fluid interface;
15 ~~treating~~ removing the surface ~~component~~ contaminant by passing the
16 workpiece through the fluid interface; and
17 terminating the ~~treating~~ removing step.

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1 13. (original) The method of claim 12 further including the step of providing
2 another fluid into the reaction vessel having a different density than either the first
3 fluid or the at least one other fluid.

1 14. (Currently Amended) The method of claim 12 wherein the step of
2 providing a workpiece having a surface ~~component~~ contaminant comprises
3 providing a workpiece having a surface ~~component~~ contaminant having a greater
4 affinity or solubility to the first fluid and the step of submerging the workpiece into
5 the reaction vessel comprises positioning the workpiece in the at least one other
6 fluid layer such that during the step of ~~treating~~ removing the surface
7 ~~component~~ contaminant, the surface ~~component~~ contaminant remains in the first
8 fluid layer.

1 15. (Currently Amended) The method of claim 12 wherein the step of
2 providing a workpiece having a surface ~~component~~ contaminant comprises
3 providing a workpiece having a surface ~~component~~ contaminant having a greater

4 affinity or solubility to the at least one other fluid and the step of ~~treating~~ removing
5 the surface ~~component~~ contaminant comprises passing the workpiece through the
6 fluid interface into the at least one other fluid layer such that the surface
7 ~~component~~ contaminant is ~~treated~~ removed with the at least one other fluid layer.

1 16. (Currently Amended) The method of claim 15 wherein the ~~treating~~
2 removing step comprises lifting the workpiece through the fluid interface into the
3 first fluid which has substantially no affinity for the surface
4 ~~component~~ contaminant.

1 17. (Previously Amended) The method of claim 12 further including the step of
2 heating the first fluid and at least one other fluid into solution after submerging the
3 workpiece into the reaction vessel such that upon cooling, the first fluid and the at
4 least one other fluid are immiscible with the fluid interface present and the
5 workpiece is substantially present in only one of the fluids.

1 18. (Currently Amended Amended) The method of claim 12 further including
2 the step of agitating the first fluid and the at least one other fluid after submerging
3 the workpiece into the reaction vessel such that upon ceasing agitation, the first
4 fluid and the at least one other fluid are immiscible with the fluid interface present
5 and the surface ~~component~~ contaminant is present in only one of the fluids.

1 19. (Canceled)

Sub D2
1 20. (Currently Amended) The method of claim 12 wherein the step of ~~treating~~
2 removing the surface component-contaminant comprises etching the surface
3 component-contaminant from a surface of the workpiece and wherein the step of
4 terminating the ~~treating~~removing step by passing the workpiece through the fluid
5 interface comprises a rapid etch stop.

C1
1 21. (Currently Amended) The method of claim 13 wherein the step of
2 terminating the ~~treating~~removing step comprises removing the first fluid from the
3 reaction vessel.

1 22. (original) The method of claim 12 wherein the steps of providing a first
2 fluid or the at least one other fluid comprises providing a pressurized gas.

1 23. (Currently Amended) A method of removing ~~water and water soluble~~
2 impuritiescontaminants from a workpiece surface comprising the steps of:
3 providing a reaction vessel containing water;
4 providing at least one fluid having a different density than the water such that
5 predominant fluid layers and a water layer exists with a fluid interface
6 between each fluid layer and the water layer;
7 passing the workpiece through the at least one fluid interface; and

8 ~~stripping removing the water and water soluble impurities~~ contaminants from
 9 the workpiece surface as the ~~water and water insoluble~~
 10 ~~impurities~~ contaminants remain in the water layer.

1 24. (Currently Amended) The method of claim 23 further including the step of
 2 removing the water layer from the reaction vessel when the step of ~~stripping~~
 3 ~~removing the water and water soluble impurities~~ contaminants is completed if the
 4 workpiece is positioned below the water layer.

1 25. (Currently Amended) A method of removing a surface ~~component~~
 2 contaminant from a workpiece surface comprising the steps of:
 3 providing an etchant fluid;
 4 providing at least one fluid immiscible with the etchant fluid having a different
 5 density than the etchant fluid and forming a fluid interface therebetween;
 6 positioning a workpiece in the etchant fluid to facilitate etching of a surface
 7 ~~component~~ contaminant on the workpiece; and
 8 terminating etching of the surface ~~component~~ contaminant when the
 9 workpiece is passed through the fluid interface into the at least one fluid
 10 immiscible with the etchant fluid.

1 26. (Previously Amended) The method of claim 25 wherein the step of
 2 providing at least one fluid immiscible with the etchant fluid comprises providing

3 two fluids immiscible with the etchant fluid, both fluids having a lower density
4 than the etchant fluid and immiscible with each other such that a first fluid
5 interface exists between the two fluids and the etchant fluid and a second fluid
6 interface exists between the two fluids.

1 27. (original) The method of claim 26 wherein the step of terminating etching
2 of the surface ^{112 Contaminant} component comprises passing the workpiece through the first fluid
3 interface into one of the two fluids.

1 28. (Currently Amended) The method of claim 26 wherein the step of
2 terminating etching of the surface ~~component~~ contaminant comprises drawing the
3 workpiece through the first fluid interface to provide a rapid etch stop and further
4 including the step of passing the workpiece through the second fluid interface such
5 that a protective coating is formed on a surface of the workpiece.

1 29. (canceled)

1 30. (canceled)